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PENSOFT

First record of the orchid bee *Euglossa imperialis* Cockerell, 1922 (Hymenoptera, Apidae, Euglossina) in Mato Grosso do Sul state, midwestern Brazil

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Abstract

The occurrence of *Euglossa imperialis* Cockerell, 1922 is recorded for the first time in Mato Grosso do Sul, Brazil. This paper extends the distribution of the species by about 800 km west of the São Paulo state, its nearest record.

Key words

Bait trap; Cerrado domain; Neotropical region; range extension.

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Introduction

The bees of the Euglossina subtribe (Silveira et al. 2002), also known as orchid bees, are distributed in 5 genera, *Eufriesea* Cockerell, 1908, *Eulaema* Lepeletier, 1841, *Euglossa* Latreille, 1802, *Exaerete* Hoffmannsegg, 1817 and *Aglae* Lepeletier & Serville, 1825, the latter being monotypic (Oliveira 2006, Nemésio 2009). Moreover, they occur widely in the Neotropical region (Dressler 1982, Cameron 2004, Nemésio 2005). *Euglossa* is the most diverse within the Euglossina subtribe, with more than 120 known species and is currently subdivided into 6 subgenera (Moure et al. 2012). The species present certain characteristics such as: size ranging from 8–18 mm, brightly metallic tegument, which usually varies between green and intense blue, with some species showing areas of red, coppery or violet (Bonilla-Gómes and Nates-Parra 1992, Silveira et al. 2002, Oliveira 2006).

Euglossa imperialis Cockerell, 1922, is a species of the subgenus *Glossura* Cockerell, 1917, distributed from Central America to São Paulo state and occurring in the Brazilian biomes of the Amazon Basin, Atlantic Forest and Cerrado (Rebêlo and Moure 1995, Rebêlo and Garófalo 1997, Rocha-Filho and Garófalo 2013, Storck-Tonon et al. 2013, Mateus et al. 2015, Suni 2016). The males of *E. imperialis* are usually attracted by cineole, eugenol and methyl salicylate (Rebêlo and Moure 1995, Nemésio 2009). Eight species of *Euglossa* have been recorded in Mato Grosso do Sul: *E. townsendi* Cockerell, 1904, *E. cordata* (Linnaeus, 1758), *E. fimbriata* Moure, 1968, *E. melanotricha* Moure, 1967, *E. pleosticta* Dressler, 1982, *E. stellfeldi* Moure, 1947, *E. viridis* (Perty, 1833), *E. annectans* Dressler, 1982 (Lima and Silvestre 2017). This study presents the first record of *E. imperialis* to the state of Mato Grosso do Sul, in midwestern Brazil.

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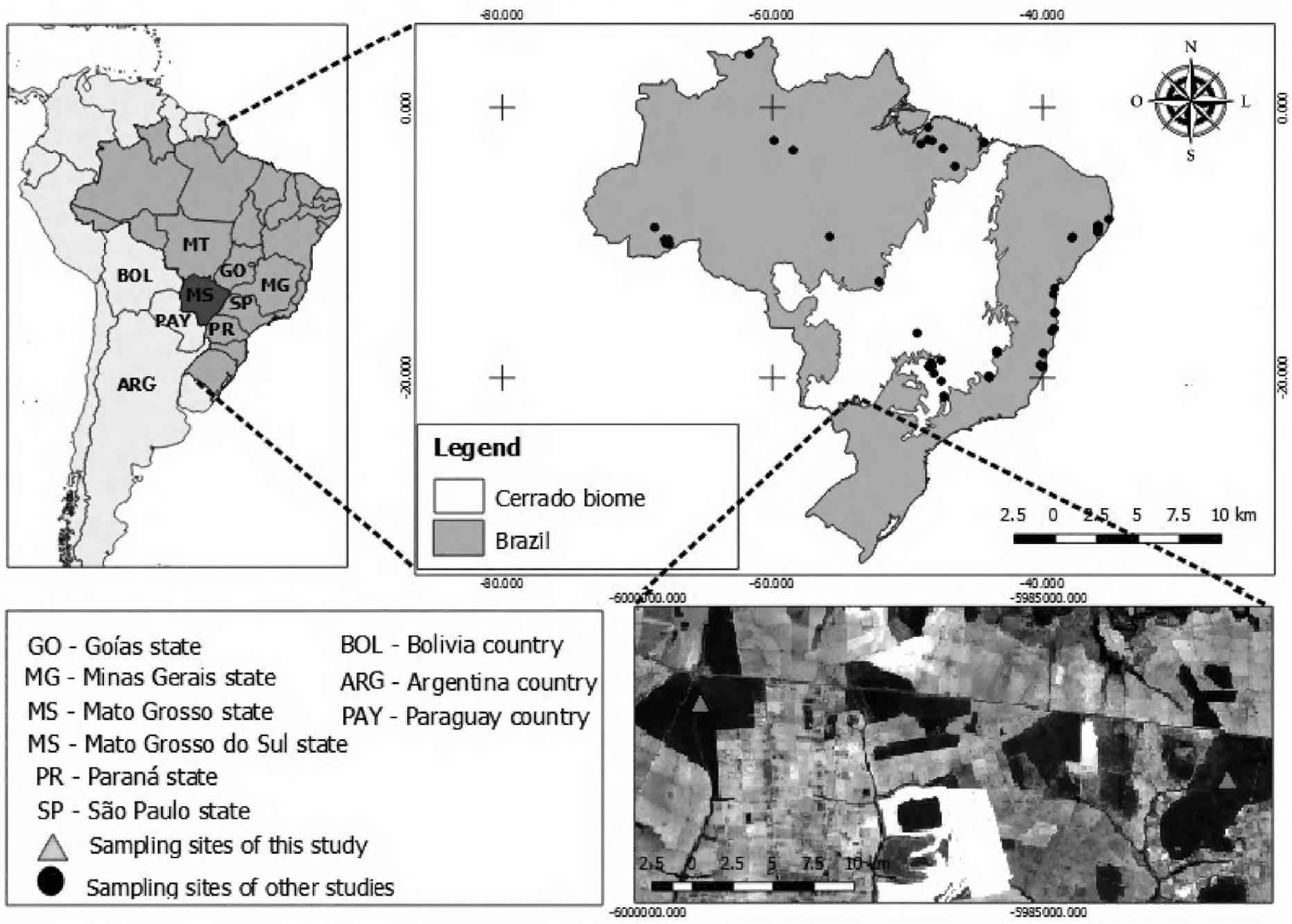


Figure 1. Distribution of *Euglossa imperialis* in Brazil and the new record.

Methods

Sampling was conducted in 2 Cerrado fragments in the municipality of Nova Alvorada do Sul (4.019 km^2), located in the southwestern mesoregion of Mato Grosso do Sul. The municipality is at an elevation of approximately 400 m, with average temperatures between 20–24 ºC, annual precipitation ranging between 1600–1900 mm and is under the influence of the tropical climate Am with dry winters (Alvares et al. 2013). The sampling localities of the *Euglossa imperialis* specimens represent the new record described here (Fig. 1).

We conducted the sampling between the months of July and August 2017 and January 2018. All specimens were captured with the use of bait traps, modified from Campos et al. (1989). The bait traps were exposed for 61 days, totalizing approximately 1464 hours. In each fragment, we used 5 attractive fragrances: cineole, vanillin, methyl salicylate, eugenol and methyl cinnamate. The specimens captured in the bait traps were preserved in a solution of 1 L of alcohol (70%) with detergent liquid and sodium chloride until it was removed, a procedure which was done every 15 days. For the identification of the species, we used the taxonomic keys of Rebêlo and Moure (1995) and Nemésio (2009). MMA and ICMBio authorized the samplings for the study (N: 60018-1). The voucher specimens are deposited in the Museu da Biodiversidade-MuBio, Federal University of Grande Dourados. The images were obtained using a Nikon camera mounted on a Discovery.V8 stereomicroscope and the final images were constructed using the software Helicon Focus. The map was produced with the presented record and known literature records (Table 1, Fig. 1).

Results

***Euglossa imperialis* Cockerell, 1922**
Figures 2–5

New record. Brazil: Mato Grosso do Sul: Nova Alvorada do Sul: Fragment-1 (21.61867° S, 053.70859° W), males, 22 July 2017, coll. J.A. Henrique, bait trap cineole, (voucher number MuBio 10481, 1 specimen; not vouchered 1 specimen). Fragment-1, male, 5 August 2017, bait trap methyl cinnamate (voucher number MuBio 10482, 1 specimen). Fragment-1, males, 18 January 2018, bait traps methyl salicylate, cineole and methyl cinnamate (not vouchered 23 specimens). Fragment-2 (21.62201° S, 053.71014° W), male, 18 January 2018, coll. J.A. Henrique, bait trap methyl salicylate (voucher number MuBio 10483, 1 specimen; not vouchered 1 specimen). Fragment-2, bait trap cineol (voucher number MuBio 10484, 1 specimen, 5 specimens not vouchered).

Identification. According to the diagnosis of Rebêlo and Moure (1995) and Nemésio (2009), males of *Euglossa imperialis* can be distinguished from other species of *Euglossa* by the following characteristics: large size of approximately 16 mm, ivory markings on scape

Table 1. Surveys of Euglossina bees with *Euglossa imperialis* records from Brazil.

Locality	Capture Method	Scent baits	Reference
Uberlândia, MG	Entomological net	1,8 cineole	Alvarenga et al. (2007)
Uberlândia, MG	Bait trap	1,8 cineole; methyl salicylate	Justino and Augusto (2010)
Pedregulho, SP	Entomological net	1,8 cineole	Mateus et al. (2015)
Canindé do São Francisco, SE; Piranhas, AL	Entomological net		Moura and Schlindwein (2009)
Rio Branco, AC	Bait trap; entomological net		Nemésio and Morato (2006)
Uberlândia, MG	Entomological net		Nemésio (2016)
Belo Horizonte, MG	Entomological net		Nemésio et al. (2015)
Valença, BA	Bait trap	Eucaliptol; methyl salicylate	Neves and Viana (1997)
Amazônia central, AM	Bait trap		Oliveira and Campos (1995, 1996)
Amazônia central, AM	Bait trap		Oliveira (1999)
Cabo de Santo Agostinho, Jaboatão dos Guararapes, Moreno, PE	Entomological net	β-ionone; 1,8 cineole; eugenol; methyl salicylate	Oliveira et al. (2015)
Ribeirão Cascalheira, MT	Bait trap; entomological net	1,8 cineole	Oliveira-Júnior et al. (2015)
Southern Bahia State, BA	Bait trap		Ramalho et al. (2013)
Buriticupu, São Luiz, MA	Bait trap	1,8 cineole, methyl salicylate, vanillin	Silva and Rebêlo (1999)
Cajuru, SP	Entomological net	1,8 cineole	Rebêlo and Garófalo (1997)
Triângulo Mineiro, MG	Bait trap; entomological net		Silveira et al. (2015)
Rio Branco, Senador Guiomard, Porto Acre, Bujari, AC	Bait trap; entomological net	Benzyl acetate, 1,8 cineole, skatole, methyl salicylate, vanillin	Storck-Tonon et al. (2009)
Rio Branco and surrounding areas, AC	Bait trap; entomological net		Storck-Tonon et al. (2013)
São Gonçalo do Rio Preto, MG	Entomological net		Antonini et al. (2016)
Tailândia, PA	Bait trap		Brito et al. (2017)
Sooterama, Linhares, ES	Entomological net		Nemésio (2013a)
Paragominas, PA	Bait trap		Solar et al. (2016)
São Gonçalo do Rio Preto, MG	Bait trap	1,8 cineole, methyl *trans*-cinnamate	Nemésio and Faria Jr (2004)
Belo Horizonte, MG	Entomological net		Nemésio and Silveira (2010)
Belo Horizonte, MG	Entomological net	Cineole, methyl cinnamate	Nemésio and Silveira (2007)
Porto Seguro, Santa Cruz Cabrália BA	Entomological net		Nemésio (2013c)
Amajari, RR	Bait traps		da Silva et al. (2013)
Goiânia, GO	Bait traps	Methyl salicylate	Grandolfo et al. (2013)
Monte Carmelo, MG	Bait traps	Methyl salicylate	Pereira and Souza (2015)
Novo Mundo, MT	Bait traps		Figueiredo et al. (2015)
Boca do Acre, AM	Entomological net	Cineole, methyl salicylate	Storck-Tonon et al. (2011)
Una, BA	Entomological net		Nemésio (2013b)
Murici e São José da Laje, AL; Jaqueira, PE	Entomological net Bait traps	p-cresol acetate, dimethoxibenzene, p-tolyl acetate, 1,8 cineole, skatole, eugenol, methyl salicylate	Nemésio and Santos Junior (2014)

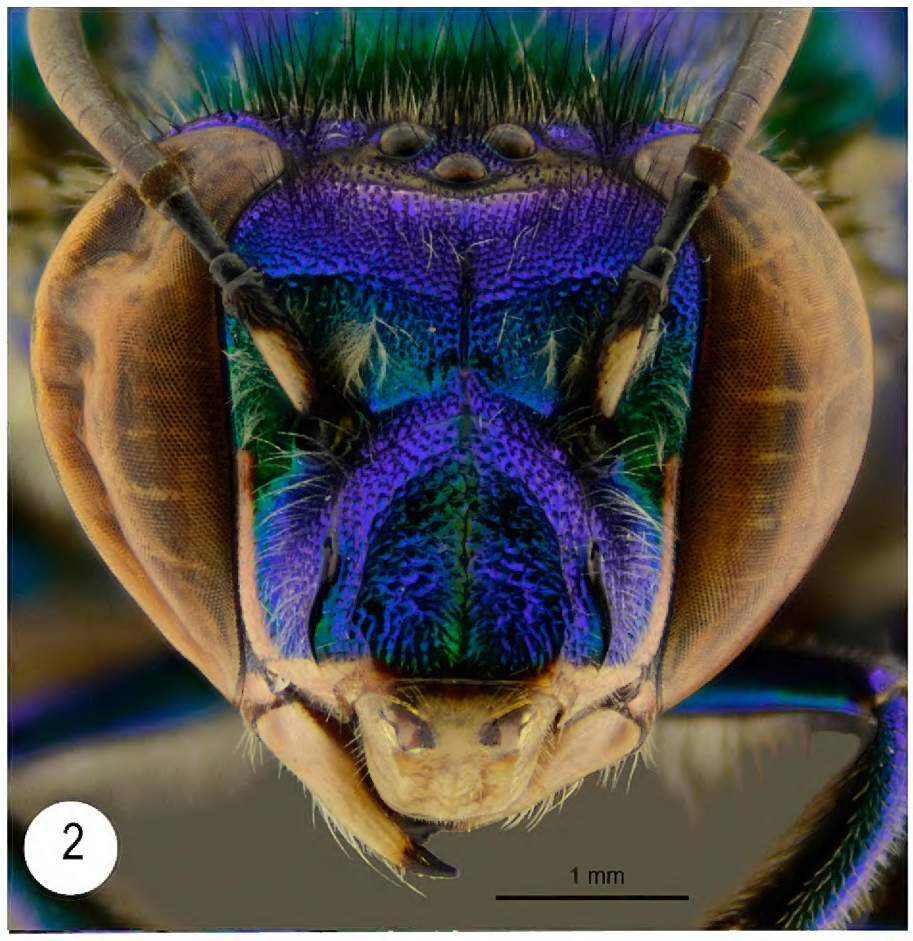
occupying one to two-thirds of the anterior surface, well developed and complete inferior ivory paraocular markings with entirely ivory malar area, extended tongue larger than body length, biconvex scutellum with strong mean depression, mandible bidentate, outer mesotibial surface with posterior and anterior tufts fused in a single one, very large and presenting triangular appearance with a subtle notched in the first third of the anterior border, triangular hind tibia, presence of slits that converge at the midline of the sternum II.

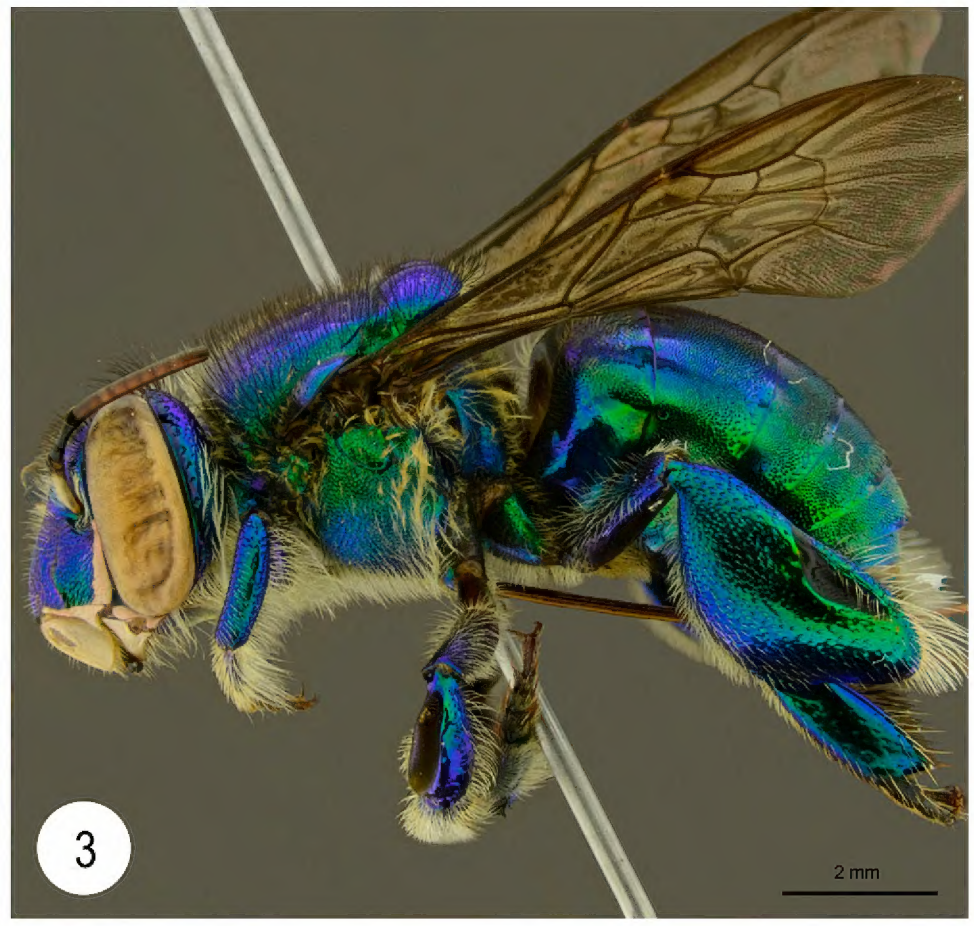
Discussion

Euglossa imperialis is considered a typical Amazonian species, being also present in the remnants of Atlantic Forest (Rebêlo and Moure 1995, Silveira et al. 2015). Several studies in most environments indicate that the species could be associated with wetter habitats (Mateus et al. 2015, Silveira et al. 2015, Brito et al. 2017). However, this species presents a large occurrence in the Neotropical region (Nemésio and Silveira 2007), being also recorded in more open areas of forests in the Cerrado (Nemésio and Faria 2004, Justino and Augusto 2010, Nemésio 2016).

We recorded males of *E. imperialis* in 2 sampled fragments of Cerrado, which may indicate the amplitude of occurrence of the species in different phytophysiognomies. In addition, the gallery forests which are also present in the region of sampling, can act as bio-corridors, enabling the species to move around the most diverse habitats as reported by Moura and Schlindwein (2009).

Our record contributes to the knowledge and distribution of the orchid bee fauna throughout the Neotropical region, since the species have a key-role in the pollina-





Figures 2–5. *Euglossa imperialis*. **2.** Front view of the head. **3.** Lateral habitus. **4.** Outer mesotibial surface (see the anterior and posterior tufts). **5.** Ventral view (see the slits indicated by the white arrow).

tion process of several botanical families (Dressler 1982, Ramirez et al. 2002). It also shows that the lack of sampling in still under-explored places contributes to the late record of a widely distributed species. We extended the distribution of the species by about 800 km to the west from its nearest record in the São Paulo state (Mateus et al. 2015, Table 1).

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Authors' Contributions

JAH collected and identified the specimen. AIS made de distribution map. JAH, AIS, VVAJ wrote the text, reviewed and approved the manuscript.

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